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Retention, Stability & Support of Complete Denture

<u>**RETENTION:-</u>** It is the resistance to removal in a direction; Opposite to that of insertion.</u>

FACTORS AFFECTING RETENTION

- **1-Anatomical Factors.**
- **2-Physiological Factors.**
- **3-Physical Factors.**
- **4-Mechanical Factors.**
- **5-Neuromuscular Factors.**

1- Anatomical Factors

- A-Size of the denture bearing area:- Retention increases with increase in size of the denture bearing area. The size of the maxillary denture bearing area is about 24 cm² and that of the mandible is about 14 cm². Hence maxillary dentures have more retention than mandibular denture.
- **B-** Quality of the denture bearing area:- the displace ability of the tissues influence the retention of the denture. Tissues displaced during impression making will lead to tissue rebound during denture use leading to loss of retention.

2- Physiological Factors: -

Saliva: The viscosity of saliva determines retention. Thick and ropy saliva gets accumulated between the tissue surface of the denture and the palate leading to loss of retention. Thin and watery saliva can also lead to compromised retention.

3- Physical Factor:-

- A-<u>Adhesion:</u> Is defined as (the physical attraction of unlike molecules to another). The role of saliva is very important for adhesion. Saliva wets the tissue surface of the denture and the mucosa. A thin film of saliva is formed between the denture and the tissue surface. This thin film helps to hold the denture to the mucosa. The amount of adhesion present is proportional to the denture base area. The patients with Xerostomia, adhesion does not play a major role.
- **B-** <u>Cohesion:-</u> Is defined as "the physical attraction of like molecules for each other". The cohesive forces act within film of saliva. The effectiveness of these forces increase with increase in denture bearing area than thick mucus saliva.
- C- <u>Interfacial Surface Tension</u>:- Is the resistance to separation possessed by a film of liquid between two well-adapted surfaces.

It is the result of the cohesive forces acting at the surface of the liquid. It is similar to the force that causes a liquid to rise in a capillary tube - the capillary attraction, or capillarity. Once again, close adaptation of the denture base to the mucosa will enhance these forces. If two microscope slides have a thin layer of water between them, it is difficult to separate them by pulling them away from each other precisely because of these forces. But they can be more easily separated by sliding one slide over the other, as the forces of adhesion, cohesion, and surface tension and capillarity will be easily overcome. This has implications for the shape of the underlying basal seat area, especially in the upper. If the shape of the palate is high and vaulted, it will be easier to displace a denture base than if the palate is flatter.

D- <u>Atmospheric Pressure & Peripheral Seal:</u>

Atmospheric pressure can act to resist dislodging forces applied to dentures, if the dentures have an effective seal around their borders.

Retention produced by an atmospheric pressure is directly proportional to the denture base area.

Peripheral seal is the area of contact between the peripheral borders of the denture and the resilient limiting structures. This peripheral seal prevent air entry between the denture surface and the soft tissue.

4-Mechanical Factors:

- A- <u>Under Cuts:</u> Unilateral undercuts aid in retention while bilateral undercuts will interfere with denture insertion and require surgical correction.
- B- <u>Magnetic Forces:</u> Intra-mucosal magnets aid in increasing retention of highly resorbed ridges.
- C- <u>Denture Adhesives</u>: They are available as creams or gels or powders. They should be coated on the tissue surface before wearing the denture.

The action of adhesive are:-

- (1) Increasing the adhesive and cohesive properties and viscosity of the medium lying between the denture and its basal seat
- (2) Eliminating voids between the denture base and its basal seat.

D-Suction Chambers & Suction Discs:- In the past suction chambers in the maxillary dentures were used to aid in retention .The suction chamber creates an area of negative pressure, which increase retention. They are avoided now due to their potency for creating palatal hyperplasia.

<u>5-Muscular Factors:-</u>

The muscles apply supplementary retentive forces on the denture. There is a balance between the forces acting from the buccal musculature and the tongue. The balance is obtained in the neutral zone. Hence, the artificial teeth should be arranged in the neutral zone to achieve the best retention possible. The occlusal plane should be parallel to the residual ridge and divide the inter-arch space equally.

Stability of Complete Denture

Is the ability of the denture to withstand horizontal forces. The various factors affecting stability are:-

1-Vertical Height of the Residual Ridge

The residual ridge should have sufficient vertical height to obtain good stability. Highly resorbed ridges offer the least stability.

2-Quality of Soft Tissue Covering the Ridge

The ridge should provide a firm soft tissue base with adequate sub-mucosa to offer good stability.

3-Quality of the Impression

An impression should be accurate as possible. The impression surface should be smooth and duplicate all the details accurately. It should be devoid of voids and any rough surfaces. It should be dimensional stable and cast should be poured as soon as possible.

4-Occlusal Plane Orientation

Occlusal plane should be oriented parallel to the ridge. If the occlusal plane is inclined, then the sliding forces may act on the denture, reduce its stability.

5- Arrangement of Teeth

The position of the teeth and there occlusion play an important role in the stability of the denture.

Balanced occlusion facilitates the even distribution of forces across the denture. The teeth in the denture should be arranged in the neutral zone. Natural or artificial teeth in this zone are subject to equal and opposite forces from the surrounding musculature.

Contour of the Polished Surfaces

The polished surfaces of the denture should be harmonious with the oral structures. They should not interfere with the action of the oral musculature.

Support Of Complete Denture

<u>Support</u>, is defined as the resistance to vertical forces of mastication ,occlusal forces and other forces applied in a direction towards to denture bearing area.

Support is derived from bone , that all forces are ultimately transmitted via the mucosa.

This depends on the anatomical and histological factors of the ridge and the way of pressure direction on the ridge during impression making procedure, therefore the maximum coverage provides the greater the support, which distributes applied forces over as wide an area as possible. The best support for denture is the compact bone covered with fibrous connective tissue.(Support depends on:

Denture base + Bone + soft tissue).

Stress Bearing Areas (Supporting Area):-

Areas of the oral structures that resist forces, strains or pressures brought on them during function. They are portions of the mouth capable of providing support for a denture, they show minimal ridge resorption even under constant load.

Stress Bearing Areas of Maxilla:

A-Primary stress bearing areas:

1-Hard palate. 2-Posterior lateral slopes of residual ridge.

B-Secondary stress bearing areas:

1-Rugae area. 2-Maxillary tuberosity.

Stress Bearing Areas of Mandible:

Primary stress bearing area

• Buccal shelf area.

Secondary stress bearing area

• labial and lingual slopes of lower residual ridge.

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